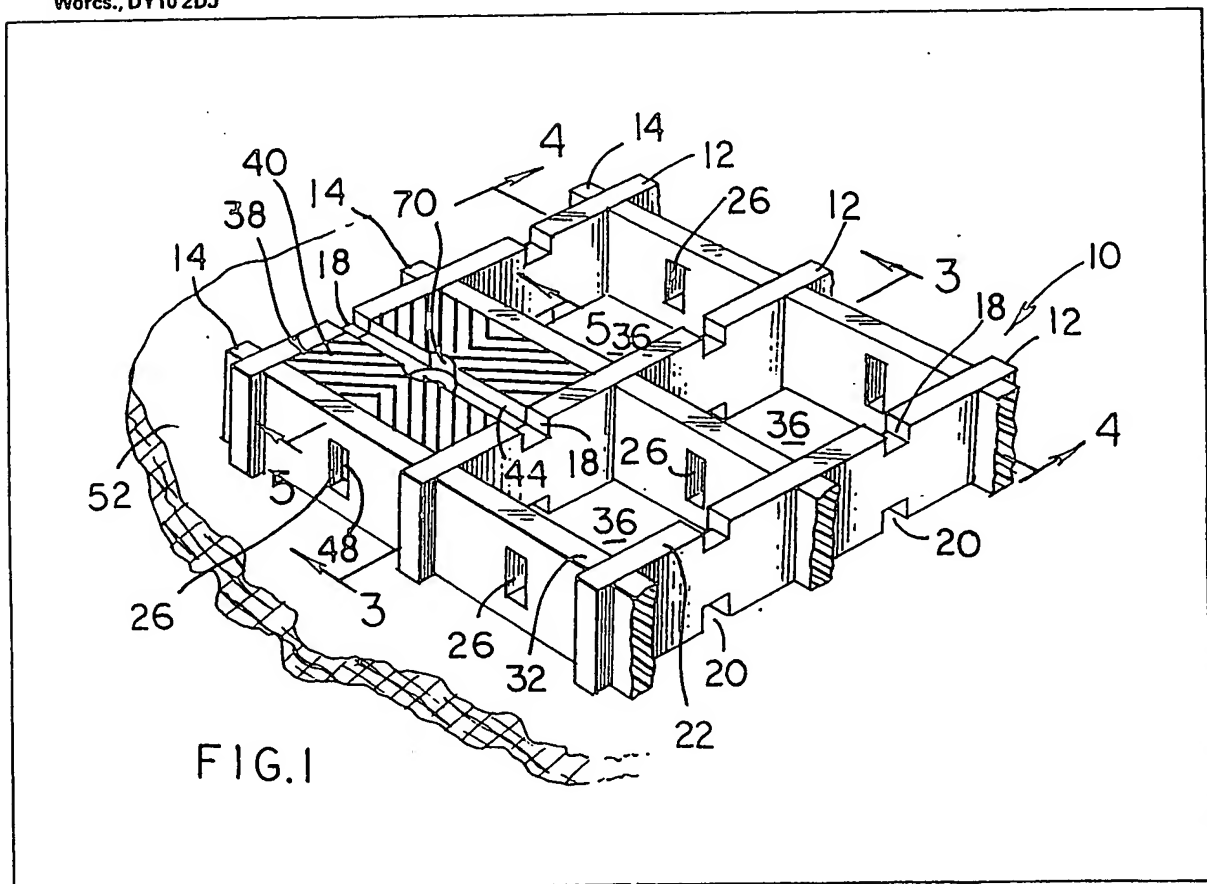


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 (71) Applicants
 The Airomat Corporation,
 2916 Engle Road, Fort
 Wayne, Indiana 46809,
 United States of America
 (72) Inventor
 James Edwin Feasel
 (74) Agents
 G. F. Redfern & Co.,
 24, High Street,
 Kidderminster,
 Worcs., DY10 2DJ

(54) Floor mat having anchoring elements and method of installing same

(57) A floor mat of the type which comprises crossed, interlocking flexible strips arranged in grid-like fashion and which includes a plurality of anchoring insert elements disposed within the rectangular interstitial spaces between the strips at various places on the mat. Said elements, which substantially occupy their entire respective interstitial spaces are provided with a pair of protruding lugs, which interlock

with suitably positioned apertures in the strips. Said elements also include an opening adapted to receive a fastener, such as a screw, for the purpose of securing certain elements to the floor on which the mat is supported. Since the elements are removable and interchangeable, they may be positioned where desired in the mat so as to provide the most effective anchoring. Furthermore, the mat can be lifted off the elements for cleaning and then replaced either in its original position or in an inverted position.



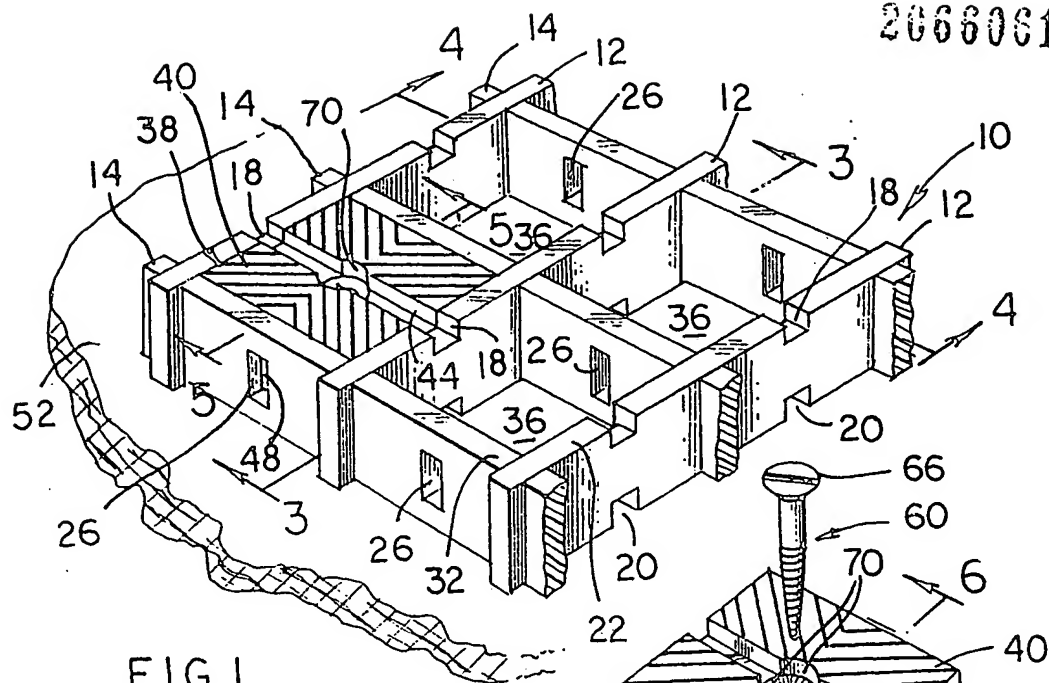


FIG. 1

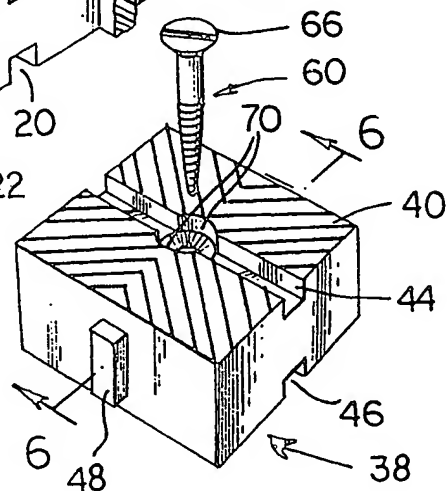


FIG. 2

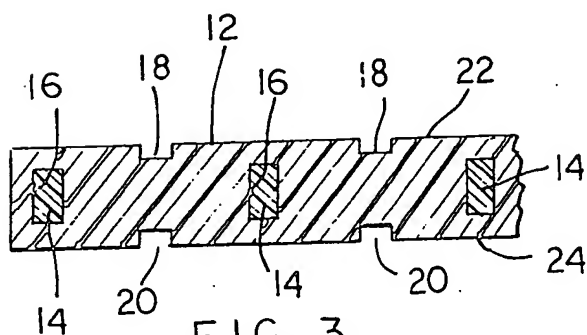


FIG. 3

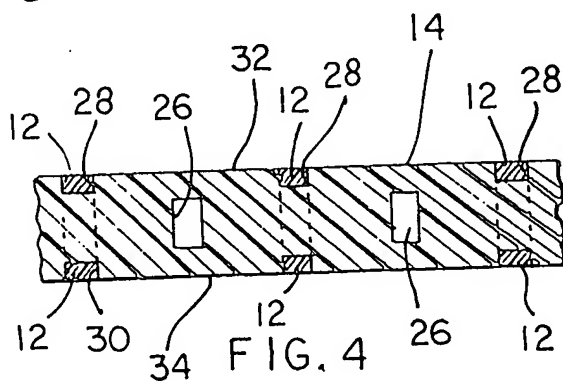


FIG. 4

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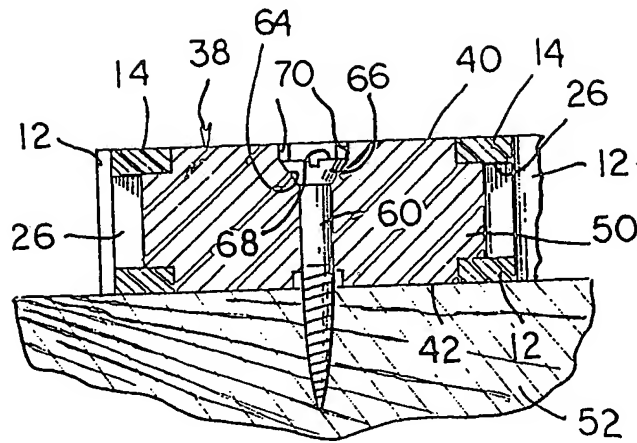


FIG. 5

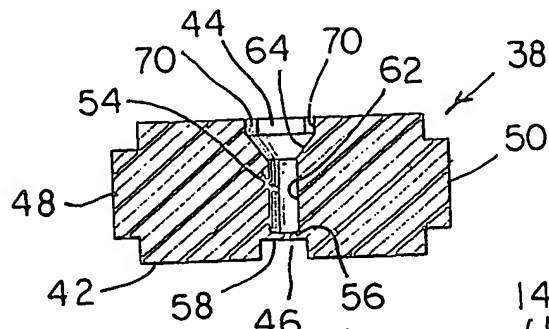


FIG. 6

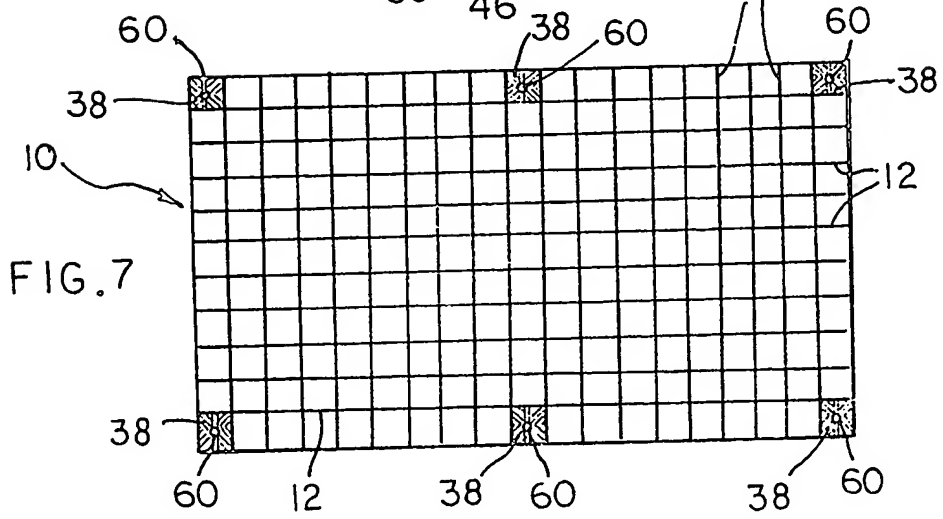


FIG. 7

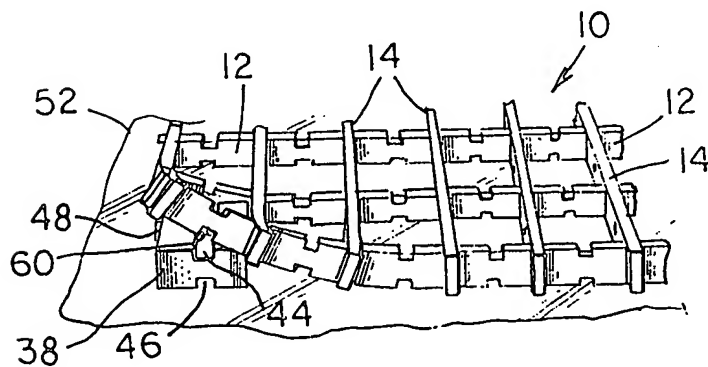


FIG. 8

SPECIFICATION

FI or mat having anchoring elements and method of installing same

5 The present invention relates to floor mats and in particular to a mat comprising crossed, interlocking flexible strips having means for anchoring the mat in place, and to the method of installing such a mat.

10 Floor mats having the aforementioned interlocking flexible strips are known, and are described in detail in U.S. Letters Patent 3,307,317. The mat disclosed in this patent comprises interlocking longitudinal and transverse flexible strips arranged in a grid-like configuration wherein all the strips are substantially identical in size and shape. Specifically, the strips have longitudinally spaced openings alternating with notches on their upper and lower edges and the mat is assembled by threading one set of strips through the openings of the other set such that the notches of the first set interlock therewith. In the assembled mat, each interstitial space defined by the strips will include a pair of aligned unused openings extending in one direction and pairs of aligned unused notches on the upper and lower edges extending in a direction perpendicular to that of the openings. The unused openings provide localized regions of increased flexibility which render the mat more comfortable in use, the unused notches on the upper surface enhance the frictional characteristics of the mat, and the unused notches on the lower surface assist in drainage.

A later development in this type of floor mat is disclosed in U.S. Letters Patent 4,109,439 wherein a system is provided for decorating or providing indicia on the mat. This is accomplished by means of individual insert elements which are positioned within the interstitial spaces enclosed by the intersecting strips and arranged in the desired pattern. The design elements are locked into the interstitial spaces by means of a pair of protruding lugs which interlock with aligned openings in two of the strips defining the respective interstitial space. The aforesaid patents 3,307,317 and 4,109,439 are expressly incorporated herein by reference.

A problem which is often encountered in connection with floor mats is that of keeping them in place, whether in front of a machine in a work station or at the entrance to a building. It is particularly important that the mat be kept in place when it is installed in a factory or the like, where heavy equipment, such as forklifts, run up and down the aisles. If a mat positioned in front of a machine in a work station is permitted to extend out into the aisle, it may be run over by a piece of equipment thereby jolting it and causing the machine operator standing on the mat to lose his or her balance and fall into the machine. In cases where the mats are installed for aesthetic purposes, such as in hallways and the entrances to buildings, the mats may be moved out of position by persons walking on them or wiping their feet. When the mats are so dislodged, the overall aesthetic appearance provided by them is impaired. A further problem with floor mats is the tendency of the edges and corners to become permanently curled as a

result of normal traffic. When the degree of curl becomes sufficiently great, it presents an obstacle to a person walking onto or off the mat and may cause the person to trip.

70 The present invention overcomes the problems and disadvantages of prior art floor mats by providing a floor mat of the flexible grid type having interchangeable and removable insert elements that have fasteners connected thereto for the purpose of securing the elements and, therefore, the mat itself, to the floor or other planar surface on which the mat is supported. Since the anchoring insert elements are removable and preferably can be inserted in any of the grid squares of the mat, they can be arranged in a pattern which affords the greatest or most efficient degree of anchoring. For example, in a light traffic area where the mat is subject only to occasional foot traffic, a sufficient degree of anchoring may be achieved by locating the insert elements merely at the four corners of the mat. In heavier traffic areas, on the other hand, where the mat is subjected to heavy foot traffic or to vehicular traffic, as in the case of aisles in factories, it may be necessary to install anchoring elements around the entire periphery, or at spaced locations around the periphery, of the mat.

When it becomes necessary to clean the mat, it can easily be removed from its location by simply pulling it up and off the anchoring insert elements, which, since they are secured to the floor, remain in place.

The anchoring insert elements each includes an opening adapted to receive a fastener, which extends through the insert element beyond the lower surface thereof so that it can be fastened to the floor. In the preferred embodiment, the fastener comprises a flat head screw, which is flush with or recessed below the upper surface of the insert element. The screw is then threaded into the floor, if the floor is made of wood, for example, or into an expandable anchor, if the floor is of concrete. The present invention is not limited to the particular fastener disclosed, but includes other fasteners which are suitable for the intended purpose, such as nails, bolts, adhesives, and the like.

Specifically, the present invention contemplates a floor mat comprising a plurality of parallel, flexible first strips and a plurality of flexible second strips extending transversely to and intersecting the first strips so as to form a grid of readily deformable grid squares each comprising a quadrilateral interstitial space bordered by an adjacent pair of the first strips and an adjacent pair of the second strips. A plurality of interchangeable insert elements are receivable respectively within various of the interstitial spaces, and include means for interlocking with the strips bordering the interstitial spaces so as to enable the insert elements to be removably locked in respective ones of the spaces. Fastener means associated with the elements secure the elements to the floor or the like whereby the mat can be anchored in place on the floor when in use.

The present invention also relates to a method of installing a mat on a planar surface, such as a floor, comprising the steps of: providing a mat including a

plurality of parallel flexible first strips and a plurality of flexible second strips extending transversely to and intersecting the first strips so as to form a grid of readily deformable grid squares each comprising a quadrilateral interstitial space bordered by an adjacent pair of the first strips and an adjacent pair of the second strips; inserting a plurality of insert elements in various of the interstitial spaces of the mat and removably locking the elements therein; and anchoring the mat to the planar surface by securing the insert elements to the planar surface with fasteners.

It is an object of the present invention to provide a floor mat which is capable of being quickly and easily anchored in place so as to resist movement which would otherwise result from persons or vehicles traversing the mat.

It is a feature of the present invention to achieve the aforementioned object by providing a floor mat having insert elements which include fasteners that secure the insert elements to the floor.

It is an advantage of the present invention that the insert elements can be positioned wherever desired on the mat so that the elements can be arranged to achieve the greatest or most efficient anchoring of the mat.

It is a further advantage of the present invention that the anchoring insert elements may be changed rapidly and easily by the end user with minimal effort.

A still further advantage of the present invention is that the anchoring insert elements locked within the interstitial spaces of the mat strengthen the mat against vertical and lateral deformation and provide additional surface area to increase the frictional characteristics of the mat.

Another object of the invention is to provide a floor mat which, although anchored securely in place when in use, can be easily lifted and removed for cleaning and then reinstalled.

Yet another object of the present invention is to provide a floor mat which can be reinstalled in inverted position in the event one side becomes excessively worn.

The above and other objects and features of the present invention will become more apparent from a reading of the following description, taken together with the accompanying drawings wherein:

Figure 1 is a fragmentary perspective view of a floor mat according to the present invention wherein one of the anchoring insert elements has been inserted and secured to the floor;

Figure 2 is an exploded, enlarged perspective view of one of the insert elements and a fastener;

Figure 3 is a sectional view taken along line 3-3 of Figure 1 and viewed in the direction of the arrows;

Figure 4 is a sectional view taken along line 4-4 of Figure 1 and viewed in the direction of the arrows;

Figure 5 is a sectional view taken along line 5-5 of Figure 1 and viewed in the direction of the arrows;

Figure 6 is a sectional view taken along line 6-6 of Figure 2 and viewed in the direction of the arrows;

Figure 7 is a diagrammatic plan view of a floor mat according to the present invention wherein insert elements have been installed at spaced positions about the periphery; and

Figure 8 is a perspective view showing the manner in which the mat is pulled off or pressed over one of the insert elements.

Referring now to the drawings, the floor mat 10 according to the present invention comprises a plurality of first elongated strips 12 and a plurality of second elongated strips 14, which extend transversely to the first set of strips 12. Strips 12 and 14 are preferably made of flexible polyvinyl chloride material, but any material having similar elastic properties which permit the strips 12 and 14 to be stretched and otherwise elastically deformed will suffice.

Strips 12 and 14 are identical to each other and are preferably of rectangular cross section. Strip 12 is provided with a plurality of longitudinally spaced openings 16 alternating with notches 18 and 20 in the upper and lower edges 22 and 24, respectively, as shown in Figure 3. Similarly, strip 14 is provided with a plurality of longitudinally spaced openings 26 alternating with notches 28 and 30 on the upper and lower edges 32 and 34, respectively, as shown in Figure 4. When mat 10 is assembled as described in the aforementioned U.S. Patent 3,307,317, notches 28 and 30 of strips 14 coincide with the openings 16 of strips 12 so as to provide an interlocked grid structure. The upper and lower edges 22, 24 and 32, 34 of strips 12 and 14, respectively, are grooved or knurled so as to improve traction. Strips 12 and 14 may be transparent or colored, depending on preference. The mat 10 may be formed as a web and then cut to length.

In a preferred form of the invention, parallel strips 12 extend perpendicularly to parallel strips 14 and the spacing is such that square interstitial openings 36 are enclosed by strips 12 and 14. It will be noted that the notches 18 and 20 on strips 12 are aligned in successive parallel rows as are the openings 26 on strips 14.

As illustrated in Figure 7, six anchoring insert elements 38 are inserted within interstitial spaces 36 at the four corners of mat 10 and at positions on the long sides of the perimeter equidistant from the corners. Alternatively, insert elements 38 could be positioned around the entire perimeter of mat 10, or at various locations on the perimeter or within mat 10, depending on the amount of anchoring which is necessary for the particular installation.

Insert elements 38 are symmetrical and each comprises an integral block of flexible polyvinyl chloride material, or another material having similar properties. Although not essential, it has been found that utilizing a material for inserts 38 which has a higher durometer, for example a durometer of 80, than the durometer of the material of which strips 12 and 14 are made is desirable. In order to provide for a tight fit and impart additional rigidity to the mat 10, insert elements 38 are preferably of a shape and size which causes them to be congruent to the interstitial spaces 36 when installed as illustrated in Figure 1. As shown, the upper surface 40 of the insert element 38, which may be grooved or knurled, is flush with the upper surfaces 22 and 32 of strips 12 and 14, respectively, and the lower surface 42 (Figure 6) is flush

with the lower surfaces 24 and 34 or strips 12 and 14, respectively. The upper surface 40 includes a groove 44 which is in alignment with notches 18 in strips 12, and the lower surface 42 includes a groove 46 which is in alignment with notches 20. Insert elements 38 may all be of a single color or of contrasting colors, again depending on preference. If desired, the insert elements 38 could be of a contrasting color to strips 12 and 14 and positioned about the perimeter of mat 10 so as to make the mat readily visible to a person approaching it.

As disclosed in the aforementioned patent 4,109,439, insert elements 38 are interlocked with strips 12 and 14 by means of a pair of laterally extending lug portions 48 and 50, which are integral with the body of insert 38. When installed, lug portions 48 and 50 are received within openings 26 in strips 14 as shown in Figures 1 and 5. In order to insert elements 38 in the desired interstitial spaces 36, adjacent strips 14 are bowed outwardly and the lugs 48 and 50 snapped into their respective openings 26. The inherent resiliency of strips 14 will retain lugs 48 and 50 and apertures 26 in engagement so that the insert elements 38 are positively locked in place. Although openings 26 preferably extend completely through strips 14, they may take the form of recesses sufficiently deep to accommodate lugs 48 and 50, if desired. From a manufacturing standpoint, however, an opening extending completely through the strip 14 is preferred. In an exemplary embodiment of the invention, strips 12 and 14 are 1/4 inch wide and 1/2 inch high, and the spacing between adjacent strips is 7/8 inch. The insert elements 38 are correspondingly dimensioned. Obviously, the spacing of strips 12 and 14 and the size thereof may be varied as desired without effecting the characteristics or operation of the mat 10.

The grooves formed by notches 18 and 20 and grooves 44 and 46 serve to assist in the drainage of water or other liquids from the mat. This is particularly important when a large number of insert elements 38 are inserted in adjacent interstitial spaces 36, or when insert elements of the type disclosed in the present application or in patent 4,109,439 are arranged in patterns, designs, words or numerals.

In order to secure anchoring insert element 38 to the floor 52 or other planar surface, a central opening 54 (Figures 5 and 6) is provided in insert element 38, and this opening 54 may be formed when the insert element 38 is molded. In order to obtain double use of insert elements 38, the opening 54 preferably does not extend completely through element 38, but is bridged by a portion of material 56 which is left intact when the insert element 38 is molded. The surface 58 of this strip or bridge of material 56 may carry the name or logo of the manufacturer, or other pertinent information, as desired. In this case, the insert elements 38 would be turned over so that side 42 would be visible in use. The strip of material 58 is sufficiently thin, however, that when a fastener, such as screw 60, is inserted, it can easily be pushed through it to the position shown in Figure 5.

Opening 54, in the particular embodiment disclosed, comprises a cylindrical lower portion 62 adapted to conform to the outer diameter of the

shank of screw 60, and a frusto-conical counterbore 64 adapted to conform to the outer shape of the head 66 of screw 60. Thus, when screw 60 is pushed through the strip of material and seated within insert element 38, the upper surface 68 of head 66 will be no higher than flush with groove 44. Although this is not essential, it is preferred so that the water drainage characteristics of groove 44 will not be impaired. As shown, the central portion groove 44 is provided with two arcuate recesses 70 dimensioned to accommodate the head 66 of screw 60.

In order to install mat 10, the desired number of insert elements 38 are inserted in the appropriate interstitial spaces 36, for example, in the location shown in Figure 7. The mat is positioned on floor 52, screws 60 are inserted within openings 54 and then punched through the thin bridge of material 56. Screws 60 are then screwed within floor 52, which has been illustrated as being made of wood. If desired, pilot holes could be drilled in floor 52 before screws 60 are inserted. In the case of a concrete floor, suitable prior art concrete or masonry type anchors would first be inserted in holes drilled in the floor so that the screws subsequently screwed into place would be sufficiently anchored. For steel floors, the inserts 38 could be secured by means of screws threaded into tapped holes in the floor.

Once the mat 10 is thus installed, it can be removed simply by pulling it up and over the inserts 38 as shown in Figure 8. Since strips 12 and 14 are quite flexible, they can easily be deformed to the point where they clear lugs 48 and 50. The mat 10 can then be cleaned and reinstalled over insert elements 38 by bowing strips 14 outwardly to permit lugs 48 to 50 to snap in place. The mat 10 can be installed either in the original position or in inverted position if one side has become excessively worn. Since insert elements 38 are secured to the floor 52, they will remain in place thereby enabling the mat to be automatically located in exactly the same position as it was previously.

While this invention has been described as having a preferred design, it will be understood that it is capable of further modification. This application is, therefore, intended to cover any variations, uses, or adaptations of the invention following the general principles thereof and including such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and fall within the limits of the appended claims.

CLAIMS

1. A floor mat comprising:
 - a plurality of parallel flexible first strips and a plurality of flexible second strips extending transversely to and intersecting said first strips so as to form a grid of readily deformable grid squares each comprising a quadrilateral interstitial space bordered by an adjacent pair of said first strips and an adjacent pair of said second strips,
 - a plurality of interchangeable insert elements receivable respectively within various of said interstitial spaces.
 - means associated with said insert elements for interlocking with the strips bordering the interstitial

spaces so as to enable the insert elements to be removably locked in respective ones of the various spaces, and

fastener means associated with said elements for securing said elements to a floor or the like, whereby the mat can be anchored in place on the floor when in use.

2. The mat of Claim 1 wherein said means for interlocking comprises interfitting lugs and openings on said insert elements and strips, respectively.

3. The mat of Claim 1 wherein said fastener means comprises an opening in said elements and a fastener which is dimensioned to be received in said opening and extend through said insert elements.

4. The mat of Claim 3 wherein the fasteners are screws.

5. A floor mat comprising:
a plurality of parallel flexible first strips and a plurality of flexible second strips extending transversely to and intersecting said first strips so as to form a grid of readily deformable grid squares each comprising a quadrilateral interstitial space bordered by an adjacent pair of said first strips and an adjacent pair of said second strips,

a plurality of interchangeable insert elements disposed respectively within various of said interstitial spaces, said insert elements having lower surfaces, said insert elements being receivably interlocked with the strips bordering their respective interstitial spaces, and

fasteners connected respectively to certain ones of said insert elements adapted for connecting said certain insert elements to a floor or the like.

6. The floor mat of Claim 5 wherein said fasteners extend through their respective insert elements and protrude beyond the lower surfaces thereof.

7. The mat of Claim 6 wherein said fasteners are screws that are received in openings in said insert elements.

8. The mat of Claim 6 wherein said insert elements are substantially congruent, respectively, to the interstitial spaces in which they are disposed.

9. The mat of Claim 8 wherein said first strips each have a plurality of longitudinally spaced openings therethrough, said openings of each of said first strips are aligned with the openings of the other of said first strips so as to form a plurality of parallel rows of said openings which extend transversely to said first strips, and said second strips extend respectively through said rows of aligned openings and are locked therein.

10. The mat of Claim 9 wherein said strips have upper and lower edges which lie in substantially parallel planes, and said insert elements are substantially flush with said upper and lower edges.

11. The floor mat of Claim 6 wherein each of said first strips have a plurality of longitudinally spaced openings, said openings of each of said first strips are aligned with the openings of the other of said first strips so as to form a plurality of parallel rows of openings which extend perpendicular to said first strips, said second strips extend respectively through said rows of aligned openings and are locked therein.

12. The floor mat of Claim 5 wherein said mat is

rectangular and said certain insert elements are disposed at the corners of said mat.

13. The floor mat of Claim 5 wherein said mat is lying on a planar surface and said fasteners are also connected to the planar surface.

14. The floor mat of Claim 5 wherein said mat is lying on a floor and said fasteners are also connected to said floor.

15. The floor mat of Claim 5 wherein said insert elements each comprise an upper surface and an opening therein, said fasteners each comprises a metal fastener having a shank and an enlarged head, said opening includes a counterbore in which the head of the fastener is received so as to be no higher than flush with the upper surface of the respective insert element.

16. The method of installing a mat on a planar surface, such as a floor, comprising: providing a mat comprising a plurality of flexible second strips extending transversely to and intersecting said first strip so as to form a grid of readily deformable grid squares each comprising a quadrilateral interstitial space bordered by an adjacent pair of said first strips and an adjacent pair of said second strips; inserting a plurality of insert elements in various of the interstitial spaces of the mat and removably locking the elements therein, and anchoring the mat to the planar surface by securing the insert elements to the planar surface with fasteners.

17. The method of Claim 16 wherein the insert elements are first inserted in the mat and are subsequently secured to the planar surface.

18. The method of Claim 17 wherein the planar surface is a floor.

19. The method of installing a mat to a planar surface, such as a floor, comprising: providing a mat comprising a plurality of flexible first strips and a plurality of flexible second strips extending transversely to and intersecting said first strips so as to form a grid of readily deformable grid squares each comprising a quadrilateral interstitial space bordered by an adjacent pair of said first strips and an adjacent pair of said second strips; providing a plurality of insert elements which are secured to the planar surface with fasteners; and subsequently pressing certain of the grid squares around respective insert elements so as to lock the certain grid squares to their respective insert elements.

20. The method of Claim 19 including the subsequent step of removing the mat from the planar surface by pulling said certain grid squares away from their respective insert elements and lifting the mat off the planar surface.

21. The combination comprising crossed interlocking flexible strips and ancillary interchangeable insert elements securable to said strips and to the floor/ground, said combination being constructed, arranged and adapted to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

22. A method of installing a mat on a planar surface substantially as hereinbefore described with reference to the accompanying drawings.

23. Any features of novelty, taken singly or in combination, of the embodiments hereinbefore

described with reference to the accompanying drawings.

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